



THE RISE OF THE 3D INTERNET

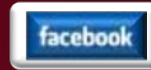
Immersive Connected Experiences (ICE)

Justin Rattner

Chief Technology Officer
Intel Corporation

MEGA TRENDS

Today



SOCIAL NETWORKING
Consumers Increasingly Use the Internet for Peering and Collaborating



USER-GENERATED CONTENT
Primary Role of the Internet Shifting From Communications to Content



BROADBAND CONNECTIVITY
Sufficient Bandwidth for Interactive, Online 3D Experience

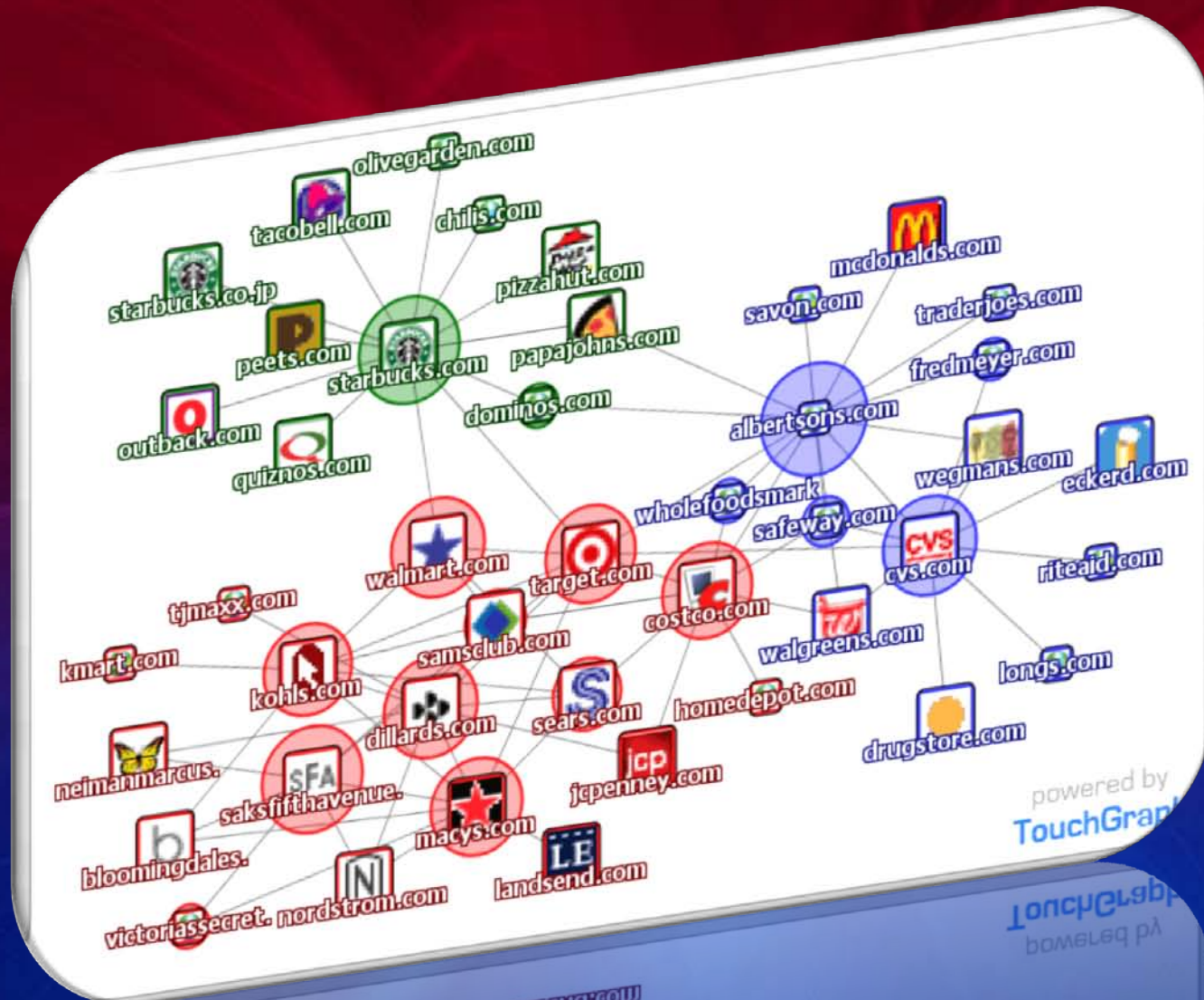


HI-DEF DISPLAY & CONTENT
Consumers Expect a Theater-like Audio/Video Experience



VIRTUAL ECONOMY
Real and Virtual Economies Have Been Connected

2D Internet of Today



E.g., Popular Retailers

RETAILERS

3D Internet of Today

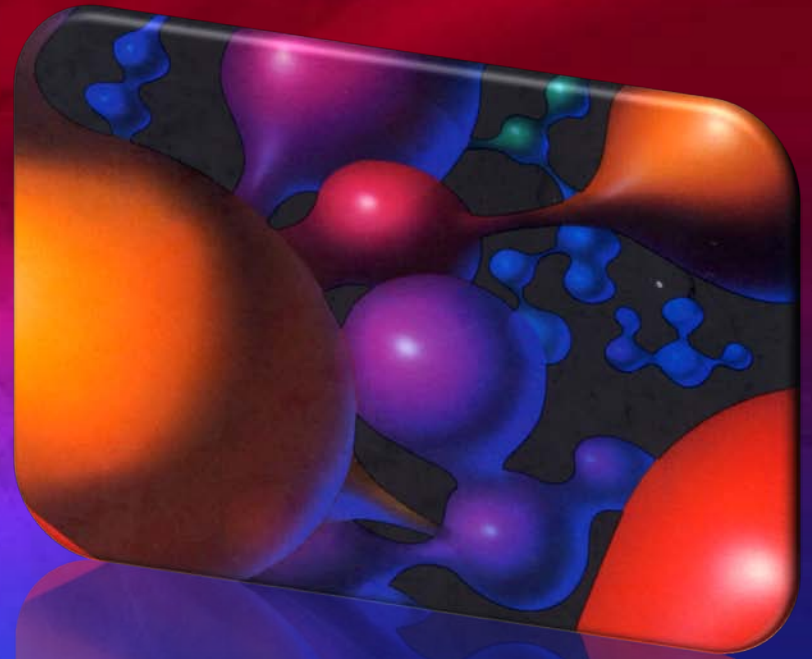


Snapshot of 3D Environments Today

3D ENVIRONMENTS Today

Source: google.com

3D Internet of Tomorrow



Conceptual Models of the 3D Internet

conceptual models of the 3d internet



3D Internet Challenges

Platform Performance

- FP intensive client/server
- Constant bandwidth
- Low latency

Simulation Services

- Dense avatar scaling
- Diverse client types
- Unified graphics/physics

User Created Content

- Portability across worlds
- Easy-to-use tools
- Realistic rendering

Ecosystem

- Stimulation standards
- 3D browser standards
- Identity with anonymity

3D Platform Performance Demands

Virtual worlds vs. Multi-Player Online Games

SERVERS: 10x More Work
75%+ Time = Compute Intensive Work

CLIENTS: 3x CPU, 20x GPU
65%+ Time = Compute Intensive Work

NETWORK: 100x Bandwidth
Maximum Bandwidth Limited by Server to Client

Sources: WoW data (source www.warcraftrealms.com), Second Life data (source CTO-CTO meeting and www.secondlife.com), and Intel measurements.

Lack of Standards for 3D User-Created Content

End Users (Consumers, Prosumers, Gamers, Enterprise, etc)

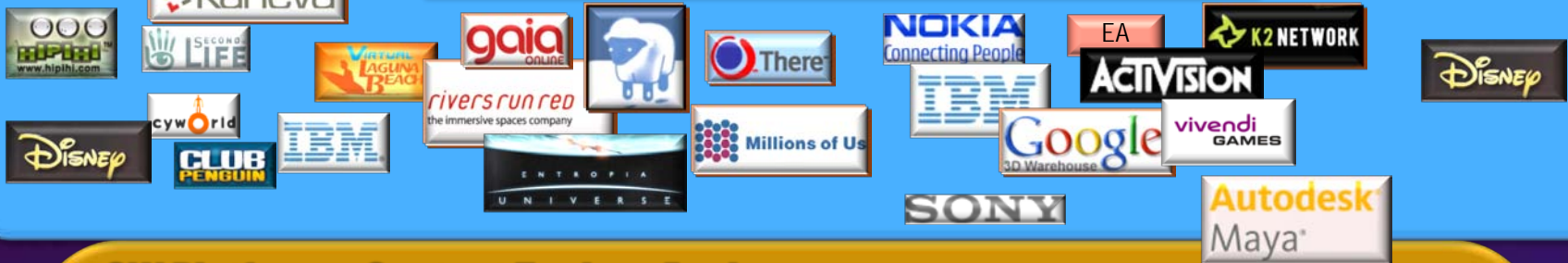
MetaVerse

ParaVerse

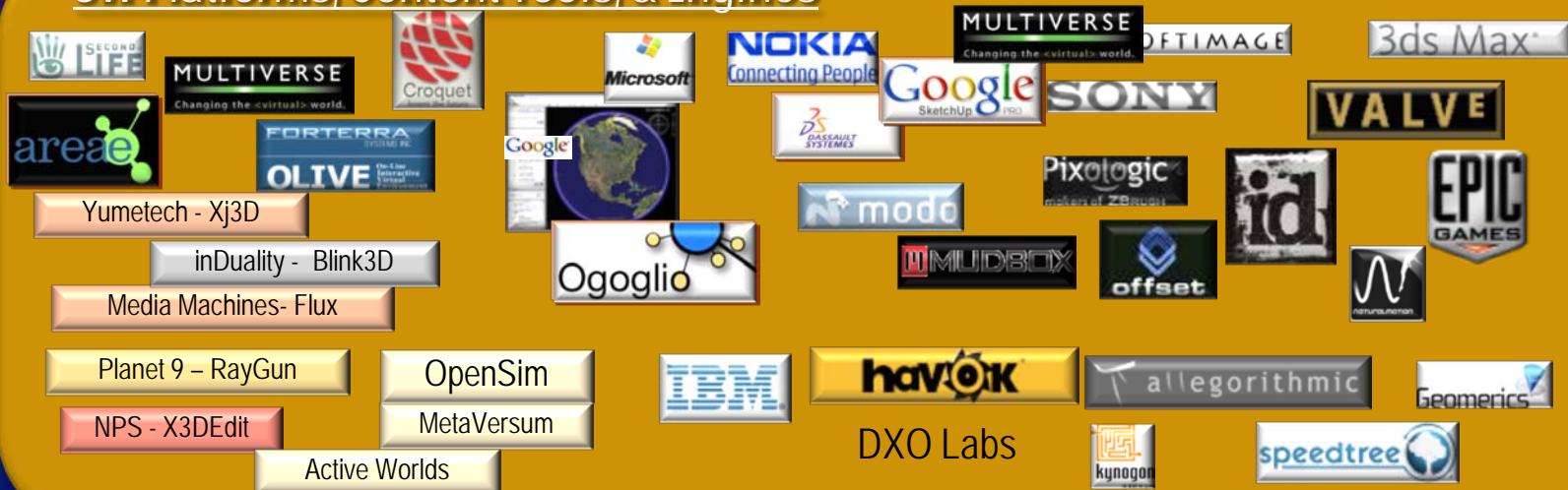
Gaming & MMOGs

Movie, CAD & TV

Infrastructure, Operators & Content Producers



SW Platforms, Content Tools, & Engines



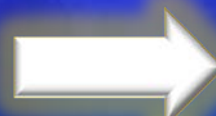
Balancing Privacy and Authenticity



Social
Interaction

Avatar
Transactions

Subscriptions
Payment Services



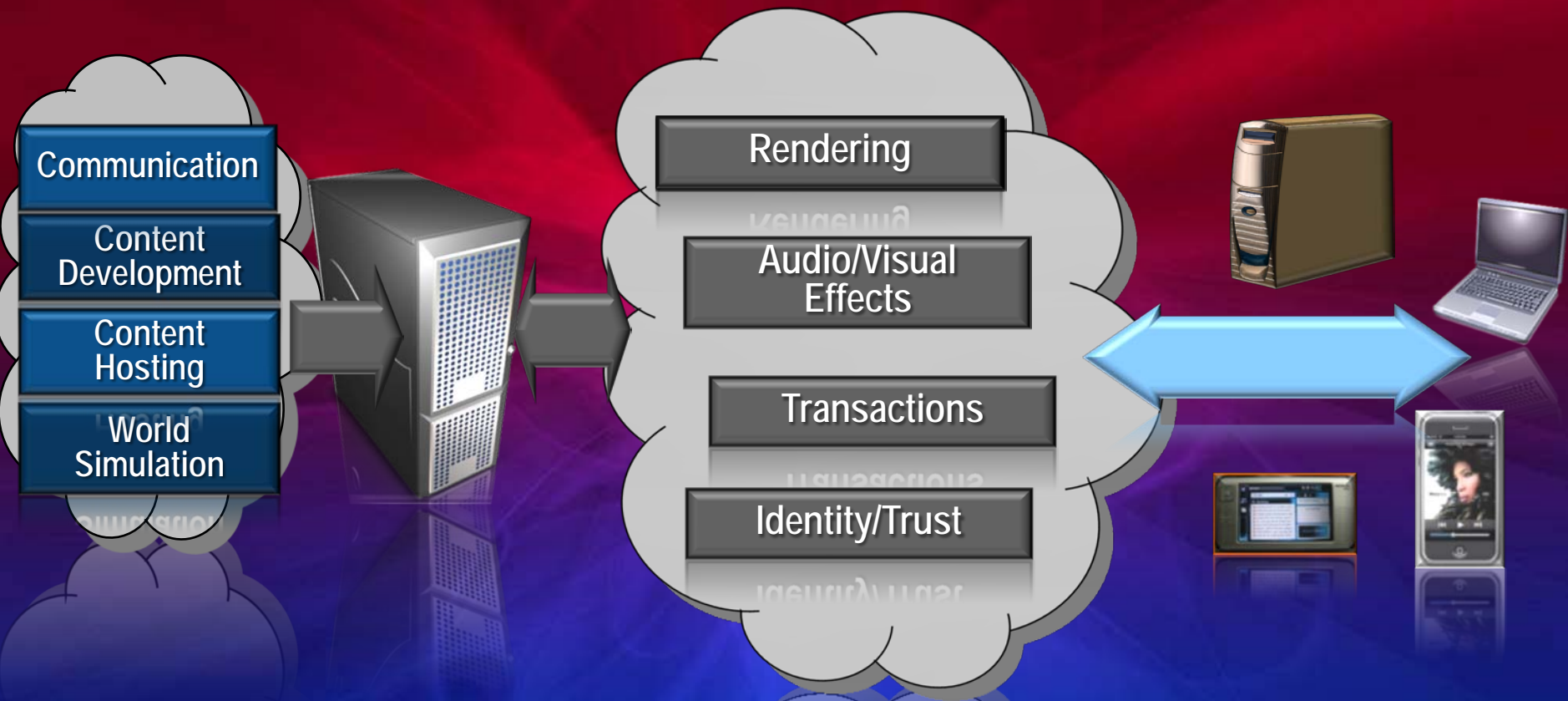
Reputation

Attestation

Authentication
Authorization

Open 3D Internet Architecture

Built on Smart Modules



Create an open architecture with smart modules

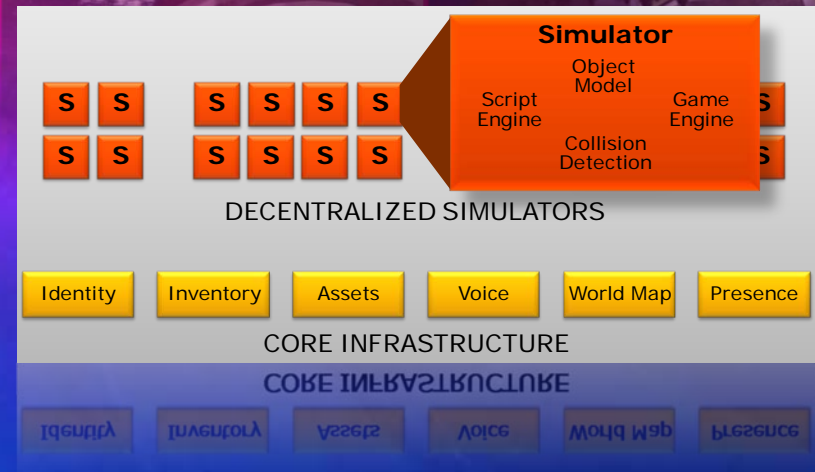
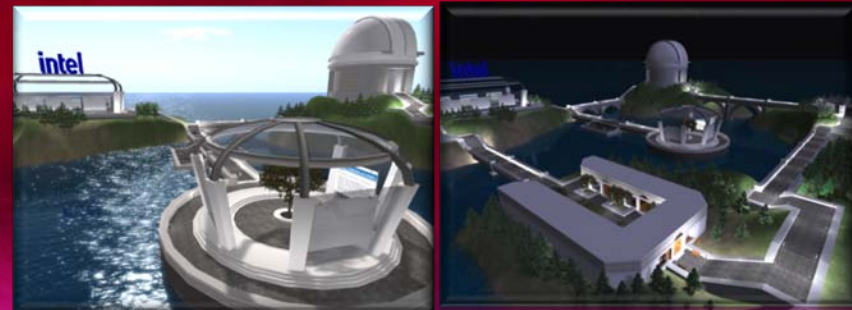
- No walled gardens
- Developers can plug and play
- Optimized modules make best use HW capabilities

3D Internet Proof Point: ScienceSim

www.sciencesim.com

- A virtual world for immersive science
- Based on OpenSim distributed simulator
- Collaboration with Supercomputing 2009
- Fostering scientific collaboration
- A test-bed for improving the virtual world experience

Working with industry players to explore innovations in distributed system scaling & interoperability



3D Internet Call to Action



Develop Open Environments and Standards

Deliver a rich variety of physical models

Create User-Friendly 3D Design Tools

Plan for Authenticity and Anonymity



Immersive Connected Experiences

How connected visual computing will change the virtual world as well as the actual world

Jim Heid, Sean Koehl, John Hengveld, Nic Bouwman and Inga Vellonis
Intel Corporation

Revision: 11/20/2008

White Paper
Research @ Intel

Executive Summary

Immersive Connected Experiences (ICE) are a new category of connected visual computing usage models in which people will share experiences and information online within highly intuitive, interactive visual interfaces. Intel examples of ICE include two main categories: Simulated Environments such as virtual worlds, online multiplayer games and 3-D movies, and Augmented Reality where images from the real world are combined with digital information to provide an enhanced view of the globe around us. This paper describes the key technical challenges in bringing these usages to the mainstream, including new client/server platform innovations, more robust distributed computing techniques, tools to facilitate user-generated 3-D content, and techniques to improve experiences on mobile devices. It also describes Intel's research agenda aimed at removing key technical barriers to the widespread adoption of ICE.

<http://blogs.intel.com/research/ICE/ImmersiveConnectedExperiences.pdf>

http://blogs.intel.com/research/2008/11/immersive_science.php

